

CC224

OPTIONAL CROSSOVER CARD FOR
PROFESSIONAL POWER AMPLIFIERS
ADVANTAGE SERIES

OWNERS MANUAL



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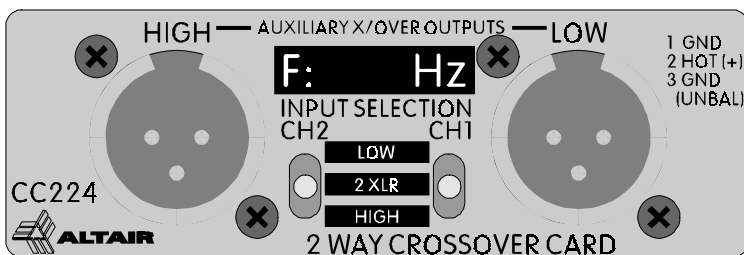


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1. INTRODUCTION



The *optional* crossover card, allow us to achieve a multiamp system with two or more ways, with an equalization point (*optional*) per way. The crossover card has two filters, one high-pass and another low-pass with a slope of 24 dB/octave LINKWITZ-RILEY type.

The relevant frequency is selectable between 50 and 750 Hz in steps of 50 Hz and between 750 Hz and 3750 Hz in steps of 250 Hz how will talk later on in special operations.

The crossover card provides two XLR-32 outputs with the two filters' output (HIGH - high pass and LOW - low pass), this allows us to carry out the signal to other power amplifiers without installing other crossover cards, or to realise a system with more ways, inserting the output signal to other power amplifier with the crossover card installing with other relevant frequency.

2. OPERATION

The outputs are unbalanced, the hot corresponds to pin 2 and the pin 1 and 3 are ground. The next table shows the output pins' correspondence:

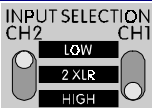
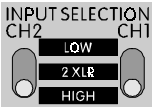
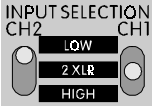
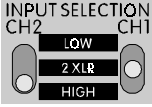
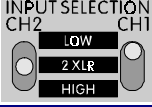
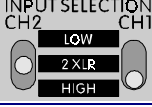
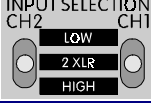
OUTPUT XLR-3-32	
PIN 1	GROUND
PIN 2	HOT (+)
PIN 3	GROUND

The signal insert in the crossover card, always corresponds to the channel 1, by this the input has to be inserted by the CH1 XLR-3-31 connector, except for the full range configuration, where each channel gets the signal from its correspondent input.

The crossover card signal insert in each power amplifier channel, can be configured with the input select switches, one per channel. The next table shows the configuration possibilities:

CONFIGURATION	INPUT SELECT SWITCHES
CH1 -> LOW CH2 -> LOW	
CH1 -> LOW CH2 -> HIGH	



CONFIGURATION	INPUT SELECT SWITCHS
CH1 -> HIGH CH2 -> LOW	
CH1 -> HIGH CH2 -> HIGH	
CH1 -> FULL RANGE CH2 -> LOW	
CH1 -> FULL RANGE CH2 -> HIGH	
CH1 -> LOW CH2 -> FULL RANGE	
CH1 -> HIGH CH2 -> FULL RANGE	
CH1 -> FULL RANGE CH2 -> FULL RANGE	

3. CONFIGURATION AND INSTALLATION

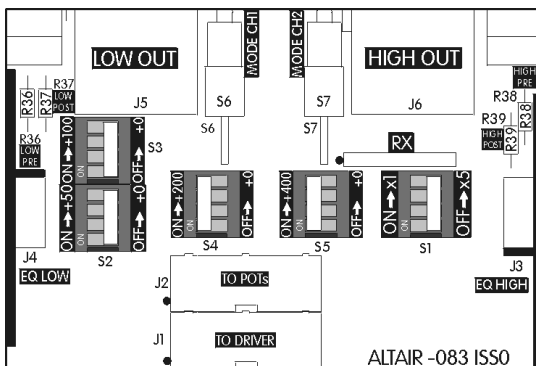
In order to install and/or setup the optional crossover card, the power amplifier advantage series must be open, removing the nine screws of their top cover.

NOTE: This type of operations, takes place with the unit open, because of what should be carried out by qualified technical personal.

WARNING: Before opening the unit, disconnect it of the mains. It is important mark that although the unit is turned off (with the power switch at position 0), if it continues connected to the mains there is different parts of the unit that are subjected to high tension.

CAUTION: Don't subject the crossover unit to rain or humidity, above all if it is open. If it comes to produce, disconnect it of the mains and warns a qualified technical service.

The *optional* crossover card (ALTAIR -083) is placed at the left of rear panel (as you face the front panel),



PLACING A CROSSOVER CARD

- 1 With the power amplifier top cover removed, remove the blind plate screws placed at the left side of the power amplifier rear panel (as you face the front panel),
- 2 Place the optional crossover card (ALTAIR -083) with its correspond plate instead of the blind plate, with the components side top view and its two screws.
- 3 Disconnect the bus cable from the bus J3 connector (POTs + LEDs) of the driver board (DRIVER A5/A11 ALTAIR -081) and connect the bus cable associated with the J1 connector (TO DRIVER) of the crossover card (ALTAIR -083) in the J3 connector (POTs + LEDs) of the driver board (DRIVER A5/A11 ALTAIR -081).
- 4 Connect the removed bus cable of the J3 connector (POTs + LEDs) of the driver board (DRIVER A5/A11 ALTAIR -081) to the J2 connector (TO POTs) of the crossover card (ALTAIR -083).

In this moment the optional crossover card is installed in the power amplifier.

RELEVANT FREQUENCY CONFIGURATION

The relevant frequency is selectable by 50Hz steps between 50 and 750 Hz and by 250Hz steps between 750 Hz and 3750.

The crossover card (ALTAIR -083) frequency adjust takes place by means of the switches S1, S2, S3, S4 and S5

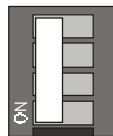
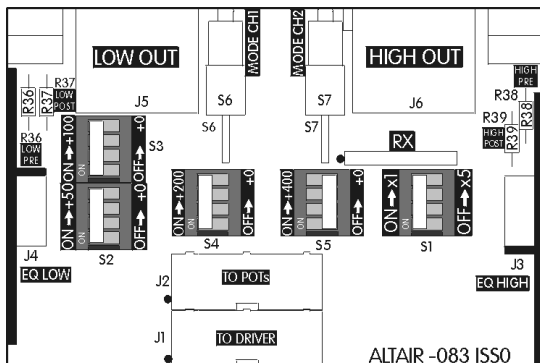
If the switches S2, S3, S4 and S5 are in the ON position (the switch towards the left, as you face the front panel of the power amplifier), add its relative value S2 -> 50 Hz, S3 -> 100 Hz, S4 -> 200 Hz y S5 -> 400 Hz to the relevant frequency, on the other hand if its are in the OFF position don't add its relative value.

The switch S1 in its ON position do nothing, and in its OFF position multiply the relevant frequency (the value of the sum of S2, S3, S4 and S5) by 5. This give rise to the next possible frequency table:

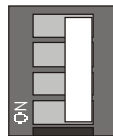
S1	POSSIBLE FREQUENCIES
S1 -> ON	50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750 Hz
S1 -> OFF	1K, 1K25, 1K5, 1K75, 2K, 2K25, 2K5, 2K75, 3K, 3K25, 3K5, 3K75 Hz



Below there are two examples:



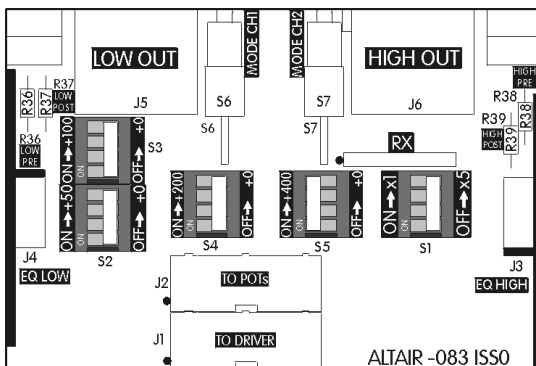
Switch in its ON position.



Switch in its OFF position.

In the previous example, the crossover card relevant frequency is configured to 350 Hz, since the sum of the switches S2 (+50), S3 (+100) and S4 (+200) that are placed in its ON position is 350, and S1 is in it ON position ON (x1).

$$\begin{aligned}
 S2 &\rightarrow +50 \\
 S3 &\rightarrow +100 \\
 S4 &\rightarrow +200 \\
 \hline
 &+350 \times (S1 \rightarrow x1) = 350 \text{ Hz.}
 \end{aligned}$$



In the previous example, the crossover card relevant frequency is configured to 2000 Hz, since only S5 (+400) is in the ON position, the total sum is 400 Hz and S1 is in it OFF position (x5) because of this, multiply by 5 the relevant frequency: $400 \times 5 = 2000 \text{ Hz}$.

$$\begin{aligned}
 S5 &\rightarrow +400 \\
 \hline
 &+400 \times (S1 \rightarrow x5) = 2000 \text{ Hz.}
 \end{aligned}$$

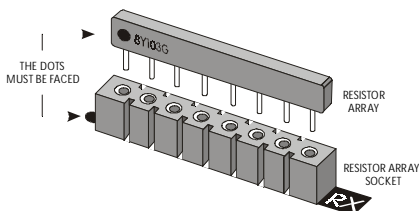
If we want to configure the crossover card with a relevant frequency that we can't obtain with the switch configuration, we can use the resistor array socket RX to configure exactly the crossover card relevant frequency. The formula that gives us the relevant frequency is the next:

NOTE: The RX value must be include between the next values:
150KΩ (maximum) y 2KΩ (minimum).

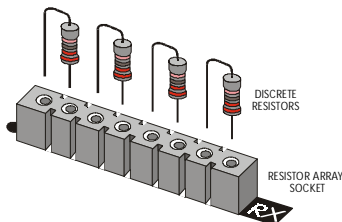
$$RX (K\Omega) = \frac{4.000}{F_c}$$



In order to insert a resistor array in the crossover card, you make coincide the dot that has the resistor array in a lateral, with the dot placed in the frequency card components picture, and locating the pins of the resistor array over the socket, push down.



Sometimes it won't be possible to find a resistor array of a certain value. If this occurs, it is possible substitute the resistor array by discrete resistors, all of the same value locating them according to show the next picture:

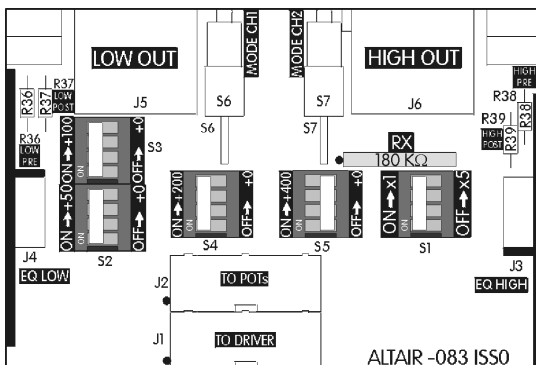


In the resistor array configuration, the switches S1, S2, S3, S4 y S5 make the same addition (S2, S3, S4 and S5) and multiplication (S1) function that in the previous configurations without resistor array.

If the switches S2, S3, S4 and S5 are in the ON position (the switch towards the left, as you face the front panel of the power amplifier), add its relative value S2 -> 50 Hz, S3 -> 100 Hz, S4 -> 200 Hz y S5 -> 400 Hz to the relevant frequency, on the other hand if its are in the OFF position don't add its relative value.

The switch S1 in its ON position do nothing, and in its OFF position multiply the relevant frequency (the value of the sum of S2, S3, S4 and S5) by 5.

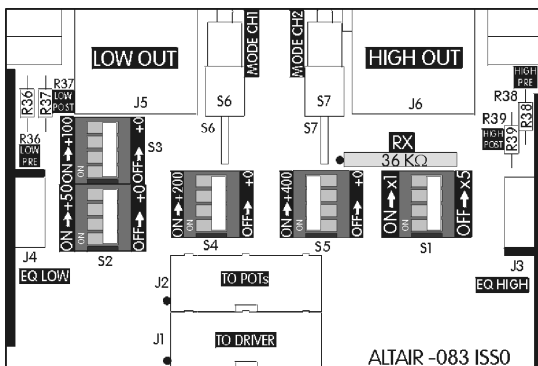
Below there are two examples:



In the previous example, the crossover card relevant frequency is configured to 372 Hz, since the sum of the switches S2 (+50), S3 (+100) and S4 (+200) that are placed in its ON position is 350, plus the resistor array RX of 180K Ω (22Hz) and S1 is in it ON position ON (x1).



$$\begin{aligned}
 S2 &\rightarrow +50 \\
 S3 &\rightarrow +100 \\
 S4 &\rightarrow +200 \\
 \hline
 RX &\rightarrow +22 \quad \rightarrow RX = 4000/22 = 180 \text{ K}\Omega \\
 &+372 \times (S1 \rightarrow x1) = \mathbf{372 \text{ Hz.}}
 \end{aligned}$$



In the previous example, the crossover card relevant frequency is configured to 2550 Hz, since only S5 (+400) is in the ON position, plus the resistor array RX of 36K Ω (110Hz) the total sum is 510 Hz and S1 is in it OFF position (x5) because of this, multiply by 5 the relevant frequency: 510x5 = 2550 Hz.

$$\begin{aligned}
 S4 &\rightarrow +400 \\
 \hline
 RX &\rightarrow +110 \quad \rightarrow RX = 4000/110 = 36 \text{ K}\Omega \\
 &+510 \times (S1 \rightarrow x5) = \mathbf{2550 \text{ Hz.}}
 \end{aligned}$$

CONFIGURACIÓN DE LAS SALIDAS DE LA TARJETA DE CROSSOVER

The male XLR-3-32 outputs HIGH (high pass) and LOW (low pass) of the crossover card, can be configured pre or post equalizer card.

For the LOW output (low pass), is available two resistors R36 and R37. If we place a 100 Ω resistor into R36 and don't place R37, the equalization will not affect to the LOW output, and on the other hand, we place a 100 Ω resistor into R37 and don't place R36, the equalization will affect to the LOW output.

For the HIGH output (high pass), is available two resistors R38 and R39. If we place a 100 Ω resistor into R38 and don't place R39, the equalization will not affect to the HIGH output, and on the other hand, we place a 100 Ω resistor into R39 and don't place R38, the equalization will affect to the HIGH output.

EQUALIZER CARD

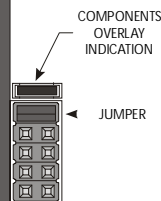
It is available an equalizer card as option, that has a point of parametric equalization, because of it has the three parameters of an equalization point adjustable: gain, frequency and Q (bandwidth). Each filter of the crossover card (High pass and Low pass) has a connector to place an optional equalizer card.



The LOW pass filter has the J4 connector, and the HIGH pass filter have the J3 connector to place the optional equalizer card.

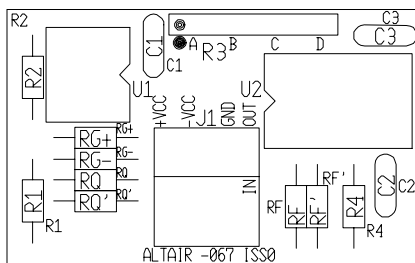
If any of these connectors doesn't have an equalizer card, this filter should have a jumper in the connector as you can see in the next picture, since if this filter doesn't have this jumper, the signal would remain off and therefore that way wouldn't work. Keep in mind this circumstance whenever you change, update or place for the first time an equalizer card. Of course in order to insert the equalizer card, you should remove the connector jumper in which you want to place the equalizer card.

As seen in the equalizer card component overlay, the jumper goes placed beside an indication. It is important notice well where the jumper goes located, because place it in other location could cause a short circuit in the power supply, and cause the crossover card and/or the power amplifier break.



EQUALIZER CARD CONFIGURATION:

The next picture shows the component overlay of an equalizer card. As seen in the picture, there are 6 resistors called RG+, RG-, RQ, RQ', RF and RF'. This resistors define the gain (RG+ or RG-), the bandwidth (RQ and RQ') and the center frequency (RF and RF') of the equalization point:



Before adjusting a equalizer card, you should decide the gain, bandwidth and center frequency that you want to implement, for this could use a parametric equalizer or a graphic equalizer and the results will be verified with a spectrum analyzer. The use of a parametric equalizer is more advisable since the adjustment parameters coincide with the equalizer card one. Keep in mind if you use a graphic equalizer that could introduce only two points of equalization for way, because of that don't use a lot of equalizer bands.

GAIN CALCULATION:

There are two resistors in the equalizer card, called RG+ and RG- that configure the equalization point gain. For the gain you should only place a resistor, if you want positive gains should place it in RG+, and if you want gains negatives should place it in RG-.

The maximum gain of the equalization point is of 15 dB, since this resistor could not be less than 2K Ω . If you want unitary gain don't place any resistance.

The next table shows the resistors that you should use for gains between 1 and 15 dB, in 1 dB steps. If you want an intermediate gain you are able to calculate an intermediate value:



GAIN	5% RESISTORS	1% RESISTORS
1 dB	82 K Ω	82,5 K Ω
2 dB	39 K Ω	38,3 K Ω
3 dB	24 K Ω	24,3 K Ω
4 dB	18 K Ω	16,9 K Ω
5 dB	13 K Ω	13 K Ω
6 dB	10 K Ω	10 K Ω
7 dB	8,2 K Ω	8,06 K Ω
8 dB	6,8 K Ω	6,65 K Ω
9 dB	5,6 K Ω	5,62 K Ω
10 dB	4,7 K Ω	4,64 K Ω
11 dB	3,9 K Ω	3,92 K Ω
12 dB	3,3 K Ω	3,32 K Ω
13 dB	3 K Ω	2,87 K Ω
14 dB	2,4 K Ω	2,49 K Ω
15 dB	2,2 K Ω	2,21 K Ω

It is always advisable that use 1% resistors, since if use 5% resistors, the gain has more variation with regard to the table.

You should be careful with the high gains adjustment (higher than 6 dB), since the crossover dynamic decreases considerably.

FILTER FREQUENCY CALCULATION:

There are two resistors in the equalizer card called RF and RF,' that configure the center frequency of the equalization point. These two resistors should be equal: RF= RF.'

The next table shows the resistors that should use for the thirty frequencies ISO standard. If you want an intermediate frequency, are able to calculate an intermediate value:

FREQUENCY	5% RESISTORS	1% RESISTORS
25 Hz	2 M Ω	1,91 M Ω
31,5 Hz	1,5 M Ω	1,54 M Ω
40 Hz	1,2 M Ω	1,21 M Ω
50 Hz	910 K Ω	953 K Ω
63 Hz	750 K Ω	768 K Ω
80 Hz	620 K Ω	604 K Ω
100 Hz	470 K Ω	487 K Ω
125 Hz	390 K Ω	383 K Ω
160 Hz	300 K Ω	301 K Ω
200 Hz	240 K Ω	243 K Ω
250 Hz	200 K Ω	191 K Ω
315 Hz	150 K Ω	154 K Ω
400 Hz	120 K Ω	121 K Ω
500 Hz	91 K Ω	95,3 K Ω



FREQUENCY	5% RESISTORS	1% RESISTORS
630 Hz	75 KΩ	76,8 KΩ
800 Hz	62 KΩ	60,4 KΩ
1 KHz	47 KΩ	48,7 KΩ
1,25 KHz	39 KΩ	38,3 KΩ
1,6 KHz	30 KΩ	30,1 KΩ
2 KHz	24 KΩ	24,3 KΩ
2,5 KHz	20 KΩ	19,1 KΩ
3,1 KHz	16 KΩ	15,4 KΩ
4 KHz	12 KΩ	12,1 KΩ
5 KHz	10 KΩ	9,76 KΩ
6,3 KHz	7,5 KΩ	7,68 KΩ
8 KHz	6,2 KΩ	6,04 KΩ
10 KHz	4,7 KΩ	4,87 KΩ
12,5 KHz	3,9 KΩ	3,83 KΩ
16 KHz	3 KΩ	3,01 KΩ
20 KHz	2,4 KΩ	2,43 KΩ

If you don't find the resistances for low frequencies, since they are very big, you could change the capacitors C2 and C3 to 33 nF, and divide the resistor value of the table by 10. This could only be made between frequencies in the range of 25 Hz and 2 KHz, since the RF and RF' resistors could never be less than 2 KΩ.

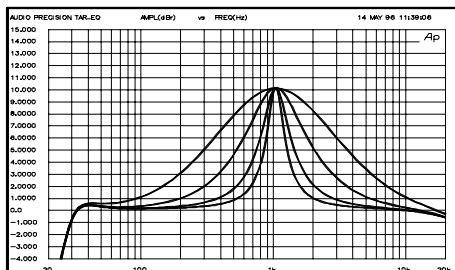
As in the gain calculation, it is always advisable that use 1% resistors, since if use 5% resistors, the frequency has more variation with regard to the table.



BANDWIDTH CALCULATION (Q):

The Q is the filter bandwidth. So that the Q is the filter center frequency divided by the difference of the higher and lower frequency, which the amplitude response is three dB down from the filter center frequency: $Q = (F_c / (F_s - F_l))$.

$$Q = \frac{F_c}{F_s - F_l}$$

The next picture shows a filter with different Q at the same frequency and gain. How you could see a high value of Q indicates a small bandwidth and a low value of Q a big bandwidth.



F = 1 KHz. Q=0,5  Q=1,0 Q=2,5 Q=5 

There are two resistors in the equalizer card called RQ and RQ' that configure the bandwidth (Q) of the equalization point. These two resistors should be equal $RQ = RQ'$.



The next table shows the resistor that you should use for bandwidths (Q) from 0.1 to 10. The maximum value allowed for the RQ and RQ' resistors are of 150 K Ω . If you want an intermediate bandwidth, you are able to calculate an intermediate value:

Q	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1
RESISTENCIA 5%	1 K	2K	3K	3,9K	5,1K	6,2K	6,8K	8,2K	9,1K	10K
RESISTENCIA 1%	1K	2K	3,01K	4,02K	4,99K	6,04K	6,98K	8,06K	9,09K	10K
Q	1,1	1,2	1,3	1,4	1,5	1,6	1,7	1,8	1,9	2
RESISTENCIA 5%	11K	12K	13K	--	15K	16K	--	18K	--	20K
RESISTENCIA 1%	11,0K	12,1K	13,0K	14,0K	15,0K	16,2K	16,9K	18,2K	19,1K	20,0K
Q	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8	2,9	3
RESISTENCIA 5%	--	22K	--	24K	--	--	27K	--	--	30K
RESISTENCIA 1%	21,0K	22,1K	23,2K	24,3K	24,9K	26,1K	26,7K	28,0K	28,7K	30,1K
Q	3,1	3,2	3,3	3,4	3,5	3,6	3,7	3,8	3,9	4
RESISTENCIA 5%	--	--	33K	--	--	36K	--	--	39K	--
RESISTENCIA 1%	30,9K	32,4K	33,2K	34,0K	34,8K	35,7K	37,4K	38,3K	39,2K	40,2K
Q	4,1	4,2	4,3	4,4	4,5	4,6	4,7	4,8	4,9	5
RESISTENCIA 5%	--	--	43K	--	--	--	47K	--	--	--
RESISTENCIA 1%	41,2K	42,2K	43,2K	44,2K	45,3K	46,4K	--	47,5K	48,7K	49,9K
Q	5,1	5,2	5,3	5,4	5,5	5,6	5,7	5,8	5,9	6
RESISTENCIA 5%	51K	--	--	--	--	56K	--	--	--	--
RESISTENCIA 1%	51,1K	52,3K	--	53,6K	54,9K	56,2K	--	57,6K	59,0K	60,4K
Q	6,1	6,2	6,3	6,4	6,5	6,6	6,7	6,8	6,9	7
RESISTENCIA 5%	--	62K	--	--	--	--	--	68K	--	--
RESISTENCIA 1%	--	61,9K	63,4K	--	64,9K	--	66,5K	68,1K	--	69,8K
Q	7,1	7,2	7,3	7,4	7,5	7,6	7,7	7,8	7,9	8
RESISTENCIA 5%	--	--	--	--	75K	--	--	--	--	--
RESISTENCIA 1%	71,5K	--	73,2K	--	75K	--	76,8K	--	78,7K	--
Q	8,1	8,2	8,3	8,4	8,5	8,6	8,7	8,8	8,9	9
RESISTENCIA 5%	--	82K	--	--	--	--	--	--	--	--
RESISTENCIA 1%	80,6K	--	82,5K	--	84,5K	--	86,6K	--	88,7K	--
Q	9,1	9,2	9,3	9,4	9,5	9,6	9,7	9,8	9,9	10
RESISTENCIA 5%	91K	--	--	--	--	--	--	--	--	100K
RESISTENCIA 1%	91,0K	--	93,1K	--	95,3K	--	--	97,6K	--	100K

One could see in the table, that there are Q values for which don't exist resistors. In that case you should approach to the nearest Q.

As in the others cases, it is always advisable that use 1% resistors, since if use 5% resistors, the Q has more variation with regard to the chart.

BAND GAIN VARIATION:

Apart from the gain, frequency and Q variations, you could vary the total band gain in which it is insert the equalization point. This one could carry out varying the R1 resistor of the equalizer card.

The formula that gives us the gain is showed in the adjacent figure, the gain in dB and the resistor in Ω . The factory value for R1 is 10 K Ω , that as you could check give a gain of 0 dB. For example, for a gain of 6 dB, the resistor R1 would be of 5.1 K Ω 5% or of 4.99 K Ω 1%, and for a gain of - 6 dB, the resistor R1 would be of 20 K Ω 5% or of 20 K Ω 1%. You should never put a less value of 2 K Ω for this resistor.

$$R1 = \frac{10000}{10^{\frac{G}{20}}}$$



You should be careful in the adjustment of high gains (great of 6 dB), since the crossover dynamic diminishes considerably.

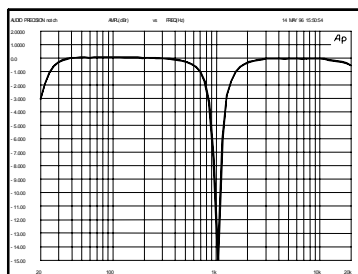
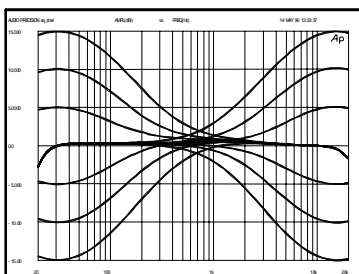
The next table shows the value of R1 resistor for different gains:

GAIN		+6 dBv	+4 dBv	+2 dBv	-2 dBv	-4 dBv	-6 dBv
R1	5%	5,1 K Ω	6,2 K Ω	7,5 K Ω	12 K Ω	16 K Ω	20 K Ω
	1%	4,99 K Ω	6,34 K Ω	7,87 K Ω	12,4 K Ω	15,8 K Ω	20 K Ω

NON-STANDARD CONFIGURATION EXAMPLES:

With the parametric equalization point, you also could simulate shelving and notch filters.

In order to carry out a shelving filter, you should select the frequency 35 Hz for low frequencies or 16 KHz for high frequencies and a very small Q of 0.4 for example. The next picture shows different answers of the equalizer card simulating shelving filters for low and high frequencies, at different gains and attenuations +5, +10, +15, -5, -10 & -15:



You could also make a filter type notch, selecting the high Q (15) that the equalizer card allows. The next picture shows a filter type notch of 15 dB of attenuation at 1 KHz:

PLACING AN EQUALIZER CARD:

Before placing the equalizer card you should adjust it, for this it is recommended that read the previous sections carefully, if you haven't done yet.

In order to place an equalizer card in the main board, follow the next steps:

1

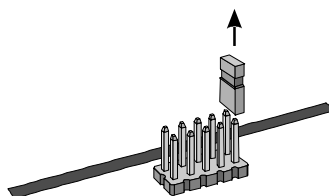
Turn off the crossover and disconnect it of the mains.

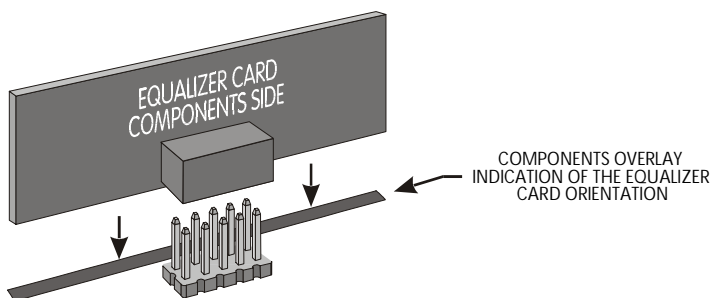
2

Remove the connector jumper where you want to insert the equalizer card (the connectors where you could insert the equalizer card are indicated in the first paragraph of the equalizer card manual).

3

Insert the equalizer card in the connector, guiding the printed circuit board toward the component overlay indication of the card orientation in the main board. Take care to insert the connector carefully, and don't move it forward, behind, left or right. All the main board male connector contacts should join in the female equalizer card connector.





WARNING: Before carrying out any operation inside the power amplifier, disconnect it of the mains. Upon being connected to the mains, the power amplifier contains elements with high tensions, and if for negligence you touch one of those parts could cause a short circuit through your body with the rising danger for your health.

CAUTION: Do not insert an equalizer card with the power amplifier turn on, this could cause its break.

CAUTION: After placing the equalizer card in a insert connector, and before turning on the power amplifier, make sure that the equalizer card is placed correctly in the crossover card connector, and that any of the connector contacts is out of it. A wrong placement of the equalizer card, could cause that the crossover card, the power amplifier and the equalizer card break.

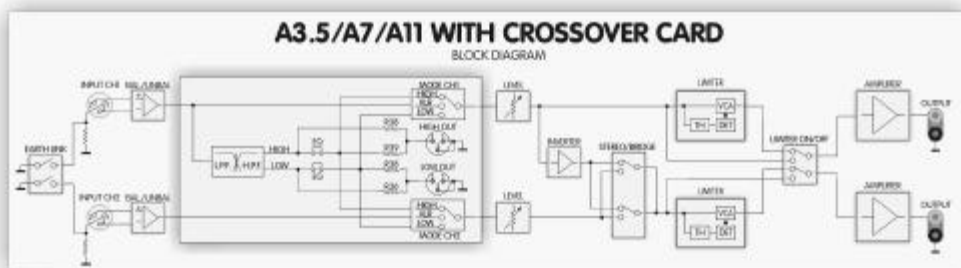
4. BLOCK DIAGRAM

Like I could see in the block diagram, the optional crossover card is placed after the input unbalanced circuit, and before the level potentiometer. The crossover filter always take the input signal of CH1, and the mode switch configure the input signal that arrive to each channel of the power amplifier.

The signal output connectors (LOW and HIGH), can be configured before or after the equalizer card, as we can see in the block diagram.

After the level potentiometer, find the BRIDGE switch (with its inverter), the limiter (with its ON/OFF switch) and the output amplifier, to finish with the power output binding post.

I could see the EARTH-LINK switch placed between the input connectors, to isolate the power amplifier electric ground, from the system mains earth.



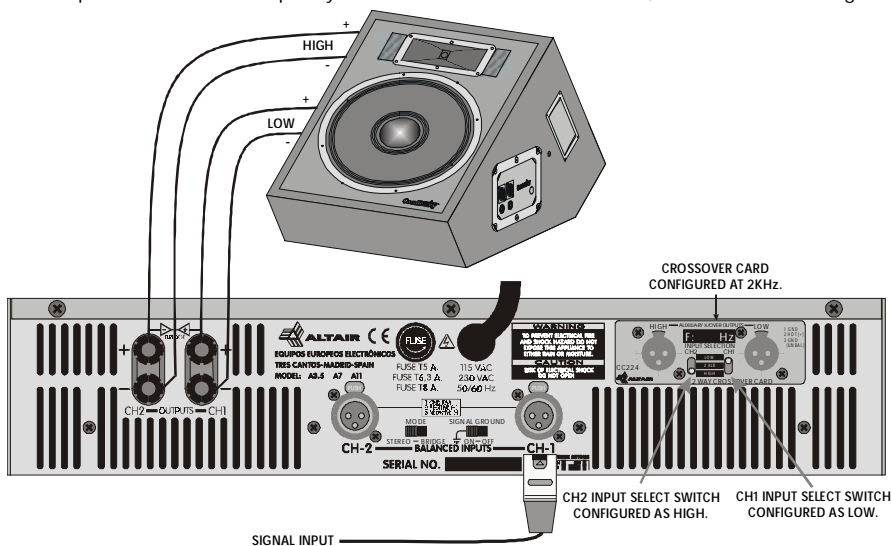


5. CONFIGURATION EXAMPLES

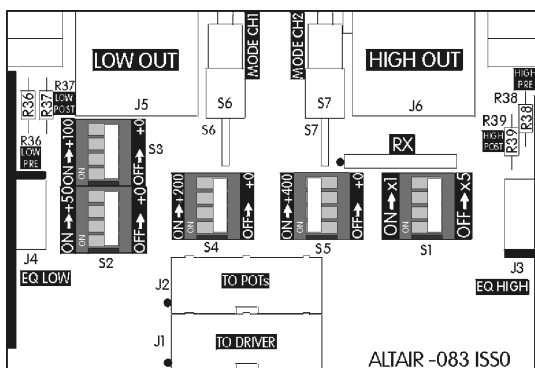
In this section, we could see configuration examples, to illustrate in an easy way the use of the crossover card.

TWO MONO WAYS CONFIGURATION

We suppose that the LOW way and the HIGH way have the same nominal power, to use only one power amplifier. The relevant frequency of the monitor is 2 KHz. In this case, we use the next configuration:

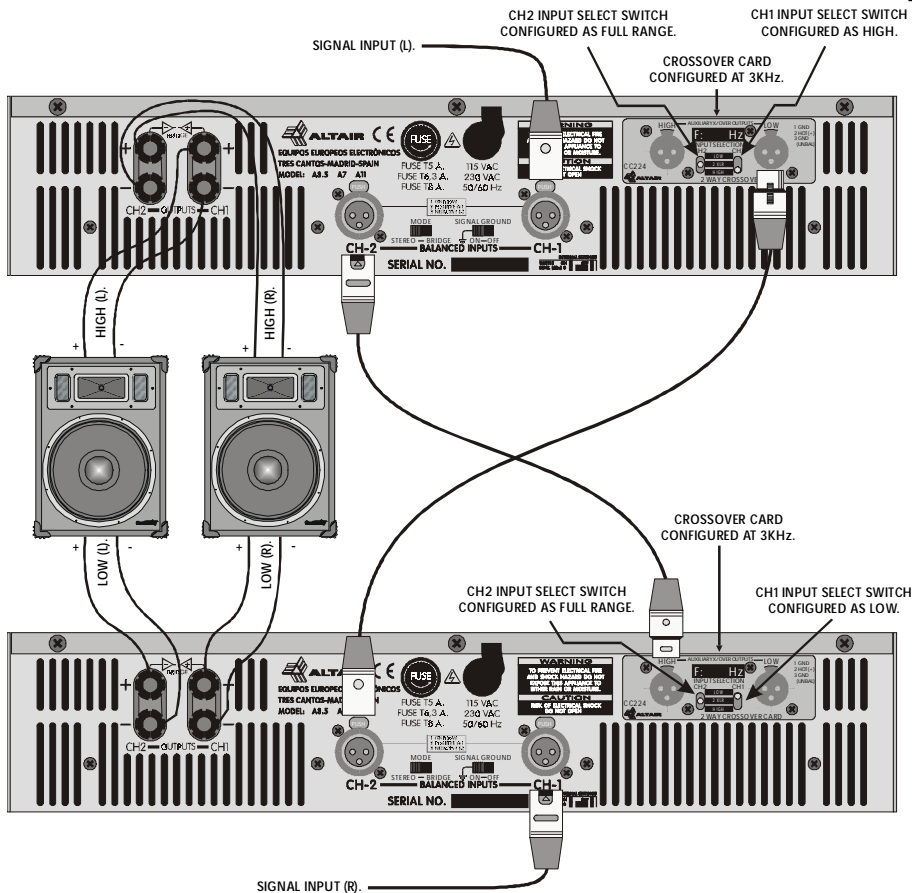


We will configure the crossover card to 2KHz, like the next picture show:

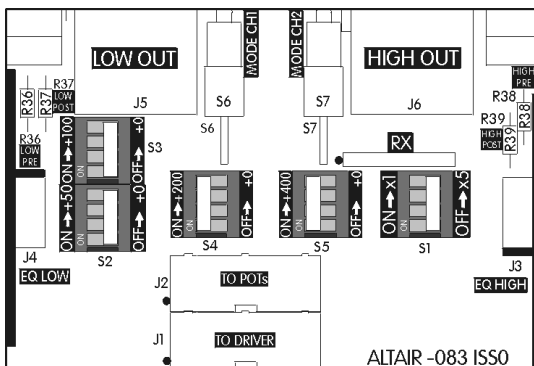


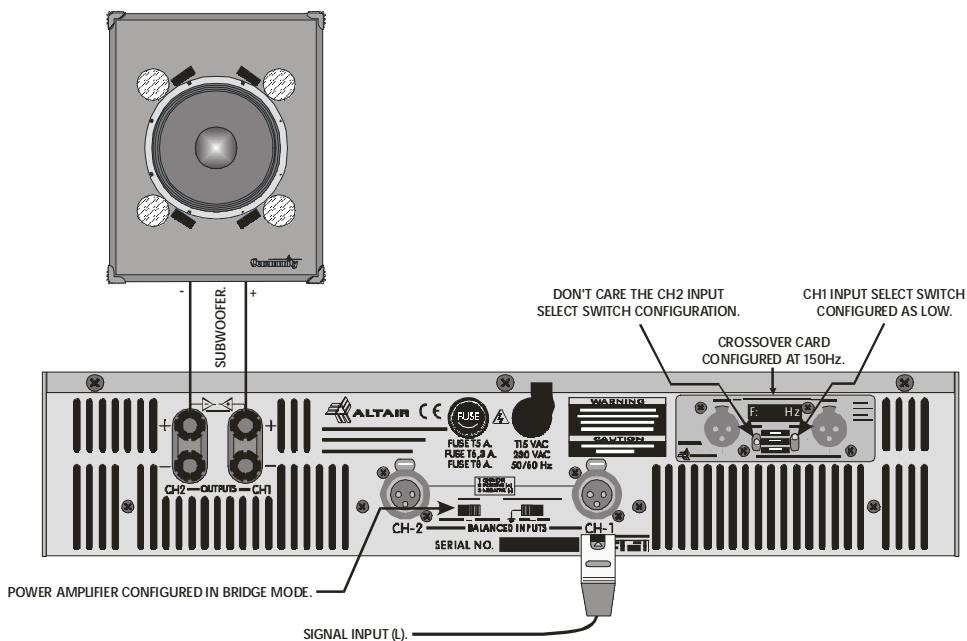
TWO STEREO WAYS PLUS SUBWOOFER CONFIGURATION

We suppose that the low, high and subwoofer ways have different nominal power, therefore we use three power amplifiers. The relevant frequencies are 3KHz for the two ways and 150 Hz for the subwoofer way. The subwoofer way will be overlapped with the low way.

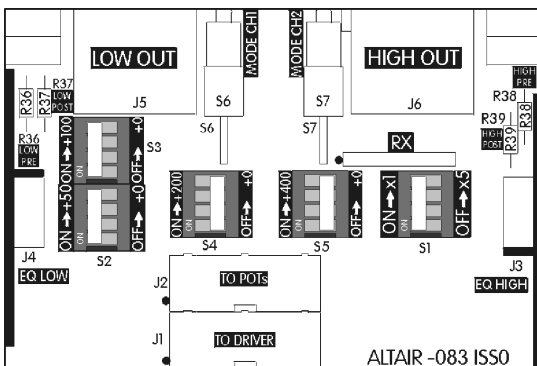


We will configure the crossover card to 3KHz, like the next picture show:



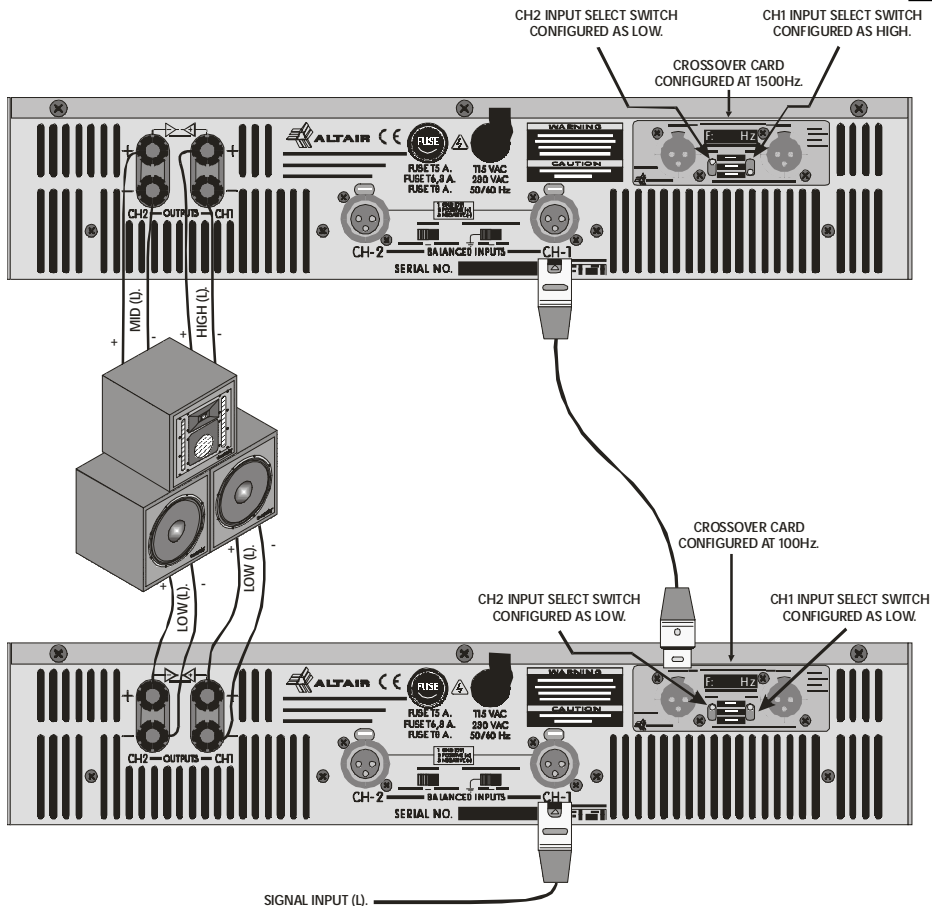


We will configure the crossover card to 150Hz, like the next picture show:

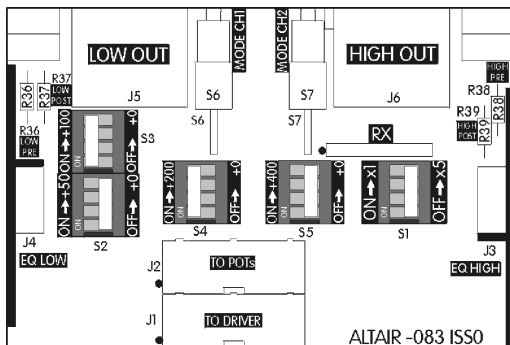
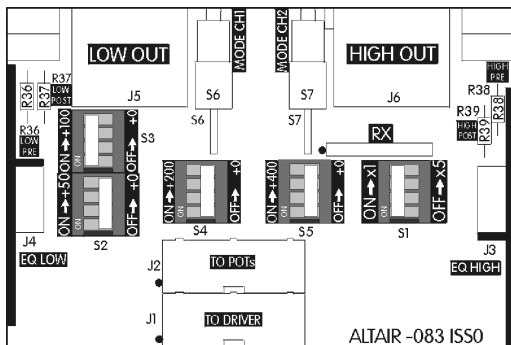


TREE STEREO WAYS CONFIGURATION

In a three stereo ways configuration, we have two relevant frequencies, and how we suppose that the nominal power of the ways is different, we need two power amplifiers per way. The relevant frequencies are 100Hz and 1500Hz. With this information, we use the next configuration (we show only the channel L, since the channel R is exactly the same).



We will configure the crossover cards to 100Hz and 1500Hz, like the next picture show:





6. WARRANTY

This unit is warranted by Equipos Europeos Electrónicos to the original user against flaws in the manufacturing and in the materials for a length of time of one year, starting from the date of sale.

Flaws due to misuse of the unit, internal modifications or accidents are not covered by this warranty.

There is no other warranty expressed or implicit.

Any faulty unit must be sent, to the dealer or the manufacturer. The serial number of the unit must be included with any request for the service.

Equipos Europeos Electrónicos reserves the right to modify the prices or the technical specifications without notice.

SERIAL NUMBER



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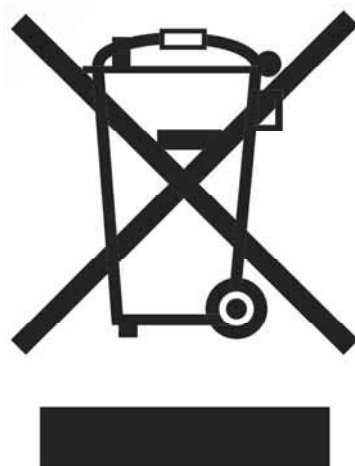
European Union Waste Electronics Information Unión Europea Información sobre residuos electrónicos

Waste from Electrical and Electronic Equipment (WEEE) directive

The WEEE logo signifies specific recycling programs and procedures for electronic products in countries of the European Union. We encourage the recycling of our products. If you have further questions about recycling, contact your local sales office.

Directiva sobre Residuos de Aparatos Eléctricos y Electrónicos (RAEE)

El logotipo de la Directiva RAEE se refiere a los programas y procedimientos específicos de reciclaje para aparatos electrónicos de países de la Unión Europea. Recomendamos el reciclaje de nuestros productos. Si tiene alguna consulta, póngase en contacto con su Distribuidor.



Information based on European Union WEEE Directive 2002/96/EC

Información basada en la Directiva de la unión europea RAEE 2002/96/EC y el Real Decreto 208/2005

AUDIO ELECTRONICS DESIGN



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